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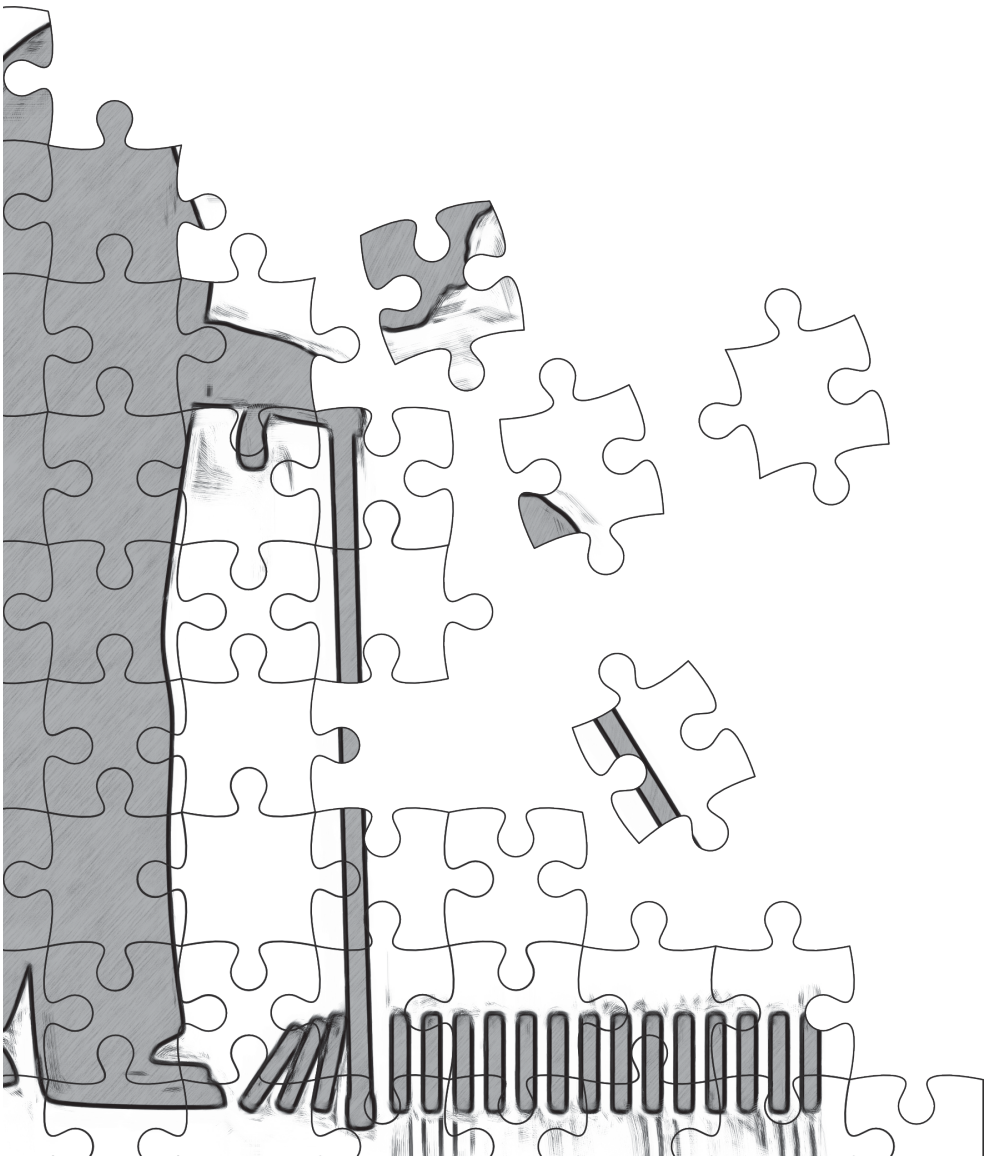

Chapter 8:

Information transfer and communication with SBAR during daily ward rounds on surgical wards

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Submitted

ABSTRACT

Objectives: This study aims to evaluate the completeness and structure of information transfer between nurses and physicians during the daily ward rounds on surgical wards after the introduction of the SBAR (Situation, Background, Assessment, Recommendation)-communication tool.

Methods: The SBAR-tool was adjusted and implemented for use in participating surgical wards in three Dutch hospitals. An observation protocol was developed to observe the use of the SBAR-structure during daily ward rounds and the process during the rounds. Monthly observations on each ward were conducted by study researchers in real-time from September 2008 until September 2009.

Results: In total, 43 daily rounds were observed in which 729 patients were discussed by the care professionals participating in the rounds. The rounds were usually led by physicians and the role of the nurses was relatively limited. The observations showed substantial variation between wards in the time to discuss a patient and the tasks performed during the rounds. The Situation was discussed for 86.9% of the patients, the Background for 77.0%, the Safety Concerns as part of the Assessment for 77.6% and the Recommendations/ actions for 87.2% of the patients. The specific timeframe for a required action was addressed for 33.7% of patients and for 5.7% actions were reported back for confirmation.

Conclusions: Many SBAR-items were often included in the patient discussions during the daily ward rounds, except for timing and confirmation of required actions. Including these items is important but changing usual practice requires a more elaborate process than only introducing SBAR and should involve the nurses and physicians from the ward.

INTRODUCTION

Communication failures are a widely recognised cause of unintended events and avoidable harm in hospital care [1-4]. Communication failures are broad and can include insufficient, ambiguous or unclear information and the exchange of faulty information [2,5]. In addition, the causation often involves complex issues, such as hierarchical differences between care professionals which can prevent individuals from speaking up [2].

The daily ward round is a recurring important communication moment in hospital care. During this round, the involved care professionals discuss the status of the patient, the treatment plan, and inform the patient. The goal of the daily ward rounds is to come to an integrated plan of care for the patient [6]. Therefore, effective communication and exchange of information between nurses and physicians during these ward rounds is important. However, Stickrath et al. found that there was limited communication between attending physicians and nurses during the rounds on a general medicine ward. In addition, relevant items such as specific aspects of the patient were not included in the discussion of the patient care plan [7].

Multiple strategies have been suggested to improve communication during clinical handover moments, such as the use of standardised communication tools. They are recommended to support an environment in which individuals can speak up and discuss their concerns [5]. Many such structured communication tools have been developed, of which SBAR (Situation, Background, Assessment, Recommendation) is identified most often in literature [8]. SBAR was originally developed by the United States Navy and used as a communication model by submarine personnel [9]. It was later adapted by Kaiser Permanente for use in hospitals as a structured and formalised model to improve effective communication between nurses and physicians [10]. The goal of SBAR is to come to a shared mental model about the patient when transferring information from one care provider to another [11]. SBAR has been tested in different settings in recent years. It showed a positive effect in hospital settings [12,13], a rehabilitation setting [14], and long-term care [15,16]. On the other hand, a study in a simulated setting showed no improvement in the telephone referral performance of junior doctors when using SBAR [17]. Also, no significant improvement was found in an interventional study within an anaesthetic clinic [18].

In the current study, we are interested in the communication process between nurses and physicians, and the use of SBAR during daily ward rounds. The study was conducted in surgical wards; 65% of adverse events in the Netherlands is related to surgery and improvement of information transfer and communication

was suggested as one of the potential strategies to avoid preventable adverse events [19]. The aim was to gain insight into the process of the rounds and the transfer of information during the daily ward rounds after the introduction of the SBAR-tool. We hypothesise that the introduction of the SBAR-tool provides the nurses with a structured format to actively present the necessary patient information to the physician in a structured manner. This should result in the discussion of relevant topics about the status of a patient during the daily ward rounds in a structured way.

METHODS

Study setting and ethical approval

This longitudinal study was conducted between September 2008 and September 2009 in surgical wards in three hospitals. Even though the data of the study were gathered some time ago the research question is still valid and in need of an answer because, to our knowledge, there is still limited evidence on the potential effects of SBAR during ward rounds. There are three types of hospitals in the Netherlands, one of each type was included in the study; a university, a tertiary teaching and a general hospital. Preselected hospitals from one region were approached for participation in the study to cover the different hospital types. They were recruited for participation through existing contacts within the hospitals. In the university and general hospital, one surgical ward participated. In the tertiary teaching hospital, the surgical ward consisted of three separate sections, they all participated. This study was one of the sub studies of the research programme on 'Patient Safety and Complex Care' [20]. The study was approved by the Medical Ethical Committee of the VU University Medical Centre in Amsterdam.

Development of SBAR-tool

The Dutch version of SBAR from the national Dutch hospital Patient Safety Program was used as a basis for the development of the tailored SBAR-tool in this study [21]. In collaboration with an experienced surgeon, additional elements relevant for clinical communication between nurses and physicians in surgical departments were added, such as date of operation, wound conditions and drains. The adapted SBAR-tool used in this study is described in table 1. After verification of the SBAR-tool with the nursing heads of the participating departments, the tool was printed on pocket-size laminated cards.

Table 1: Adapted SBAR tool for face-to-face communication between nurse and physician

Situation	• Patient identification • Current situation of the patient • Recent changes in the situation of the patient • Patient response to the treatment
Background	• Admission diagnosis and date of admission • Date of surgery, wound condition and drains • List of medication, allergies • Most recent measurement and values of vital signs • Lab values including date and time of test • Other relevant clinical information • Mental condition of the patient
Assessment	• Which actions were taken or are required AND provide an overview of arguments that led to the (required) action • What are the safety concerns for this patient: critical lab values / important reports, risks (falls, delirium)
Recommendation	• Necessary Actions including timing, urgency and priority • Who is responsible for the execution of the actions • What is the plan for this patient: what happens next, expected changes, are precautions necessary?

Implementation of SBAR-tool

Before the start of the study, interviews were conducted with the medical and nursing heads of the departments to get insight into the characteristics of the department and the perceived value of a tool to structure clinical communication during the daily ward rounds. They indicated that using SBAR would be valuable for the daily rounds for the following reasons: structure could be improved during daily rounds, there is a limited role for the nurse, there are different expectations between nurses and physicians in the type of information to discuss and the way this is discussed. Next, the physicians and nurses of the departments were informed about the study by the medical and nursing head.

The implementation of SBAR was primarily aimed at facilitating the communication between the nurses of the department and the physicians. The nurses received a training before the start of the study in which they were instructed on the use of the instrument during the communication moments, such as the daily ward rounds. This training included the following elements: discussion on the usual procedure during the ward rounds, the SBAR-instrument itself and how to use the instrument during handover moments. It was explained that monthly observations of the ward rounds would be conducted to evaluate the use of SBAR. All nurses received a SBAR-card to use during the handover moments. Nurses who were not able to attend one of the meetings were informed with an information leaflet which contained the aforementioned subjects and the SBAR-card. Also, medical staff of the department was informed about the introduction of the SBAR-instrument by email or letter. Information leaflets were made for physicians, informing them about the study and the observations during the rounds.

As a reminder and motivator, newsletters about the study and use of SBAR were made and distributed every three months. Many changes in personnel occurred on the participating wards during the study. Therefore, the SBAR was handed out to the nurses a second time halfway through the study (Spring 2009), and they were again instructed on the use of the instrument.

Observation protocol

An observation protocol was developed to observe the use of the SBAR-tool and other contextual factors during the rounds. The observation protocol consisted of two different parts; the first part regarded the general process of each round. For example, information was collected on who takes the lead during the rounds and whether the care professionals participating in the rounds gave their opinion about the suggested treatment. Also, the time at the start and end of the rounds was recorded to calculate an average time per patient. The second part of the observation protocol was aimed at observations on the individual patient level. It consisted of multiple observable questions based on the SBAR-structure. For the elements Assessment and Recommendations specific observable elements were extracted from the SBAR-structure. The questions included in the individual patient observation protocol were:

1. The current Situation of the patient (yes/no)
2. Background of the patient (yes/no)
3. Specific safety concerns (part of the Assessment of the status of the patient) (yes/no)
4. Required actions (part of the Recommendations for the patient) (yes/no)
5. Timing/urgency of actions (part of the Recommendations for the patient) (yes/partly/no)

In addition to the SBAR-structure, two items were added to the observation protocol, namely:

6. Confirmation of the mentioned actions (yes/partly/no)
7. Was the SBAR-structure followed by the nurse when discussing this patient? (were all elements mentioned in the correct order by the nurse) (yes/partly/no)

In addition to the items mentioned in the protocol, the observers made notes during all observations to collect additional information about the context of the rounds, such as how busy it was on the wards. The observation protocol was tested before the start of study: daily ward rounds were observed by two researchers using the protocol. These test sessions were used to test the items

in the protocol and for consensus between researchers about the scoring of the items.

Observations

At least once a month, one of the study researchers (with a background in psychology) observed the daily ward rounds in real time in each of the three wards. Because the ward rounds were done at the same time in the three sections of the surgical ward in hospital 1, only one section could be observed at a time. The observer did not intervene in the rounds and observed from a distance in order not to disturb the process and to respect the privacy of patients. No care professional identifiers were registered during the observations to secure the privacy of all involved, only the number and type of care professionals attending the rounds were registered. All care professionals were informed about the observations before the start of the study. It was emphasised that all results would be reported anonymously and that the observations were not measuring individual performances. None of the care professionals objected to participating in the study. If new care professionals were present during the rounds, the observer explained the purpose of the observations and asked whether they agreed with the observations. No patient identifiers or medical information was registered by the observers. They only recorded whether the items were discussed or not.

Statistical analyses

All results were analysed with SPSS for Windows V.20.0. Descriptive statistics were used to analyse the data on the characteristics of the wards, the daily ward rounds and the use of SBAR during the information transfer between the nurses and physicians for individual patients. Differences between wards with respect to the average time to discuss a patient (in minutes) and number of care professionals participating in the rounds were tested with univariate ANOVA's, a p-value of <0.05 was considered a significant difference.

RESULTS

General observations on process of the rounds

All three participating wards were fairly comparable in the way the rounds were conducted. The rounds started between 7.30 - 8.00 am and were mostly led by the ward physician. The ward physician was sometimes accompanied by a member of the surgical staff or an intern. In ward 1 and 2 the patients were discussed by the nurse and physician in the corridor before they entered the room to talk to the patient or do a physical examination. In ward 3, the physicians discussed the patient situation near the bedside, often combined with an examination of the patient. Usually, the nurse accompanied them and had the nursing record of the patient available to answer questions of the physician. In all three wards, the patient was usually informed about the next steps in their treatment. Table 2 shows the background characteristics of the participating wards and the results of the observations on the general level. It shows that in ward 3, on average, more care professionals were involved in the rounds than in the other two wards ($p<0.001$), such as medical students during their internship on the surgical ward. The mean time to discuss a patient differed significantly between ward 2 and ward 3 ($p< 0.01$). In ward 2 actions were often completed immediately during the rounds, which resulted in a longer average time needed per patient. Table 2 also shows that interruptions during the rounds did not occur often and that questions were asked regularly or often in ward 1 and 2 during the daily rounds, but less so in ward 3. The percentage of rounds in which unasked comments, suggestions for treatment and opinions are regularly or often given is quite low. In ward 2, additional information and clarification was given regularly or often in more than 40% of the rounds, in ward 1 this was in almost 29% of the rounds and for ward 3 this only occurred in 8% of the rounds. Having an open attitude towards each other was common in ward 1 and 2, but less so in ward 3.

Table 2: Characteristics of wards and rounds

	Total, no. (%)	Ward no.1, no. (%)	Ward no.2, no. (%)	Ward no.3, no. (%)
Hospital type	NA	Tertiary teaching	General	Academic
Number of daily rounds observed	43	14	16	13
Number of beds on the surgical ward	28	24 for each section within the ward, 72 in total	30	30
Mean number of health care professionals participating in the rounds* #(range, median)	4 (2-10, 3)	3 (2-7, 3)	3 (2-5, 3)	6 (2-10, 5)
Mean number of minutes for discussing a patient (range, median) **	4.8 (1.9-21.8, 3.7)	4.3 (2.5-5.9, 4.5)	7.4 (3.3-21.8, 5.2)	2.5 (1.9-3.1, 2.5)
% of rounds in which one care professional **often** took the lead (=ward physician)	36 (83.7)	12 (85.7)	11 (68.8)	13 (100.0)
% of rounds in which interruptions occur **regularly or often**	2 (4.6)	-	2 (12.6)	-
% of rounds in which questions are **regularly or often** asked by the participants	24 (55.8)	11 (78.6)	10 (62.5)	3 (23.1)
% of rounds in which unasked comments are **regularly or often** given	2 (4.6)	1 (7.1)	-	1 (7.7)
% of rounds in which a suggestion for treatment is **regularly or often** given by the other care professionals (not in the lead)	-	-	-	-
% of rounds in which the participants **regularly or often** give their opinion	6 (14.0)	3 (21.4)	2 (12.5)	1 (7.7)
% of rounds in which additional information and clarification is **regularly or often** given	12 (27.9)	4 (28.6)	7 (43.8)	1 (7.7)
% of rounds in which the participants seem to have an open attitude towards each other	35 (81.4)	13 (92.9)	16 (100.0)	6 (46.2)

** Different nurses participated in the rounds; they joined the rounds when their patients were discussed. Therefore, they were counted only once.*
 # Significant difference between ward 3 from 1 and 2 $F(2,41)=11.76$, $p < 0.001$
*** Significant difference between ward 2 and 3 $F(2,37) = 7.39$ $p < 0.01$*

Individual patient observations of SBAR elements

During the 43 rounds the transfer of information for 729 individual patients were observed. Table 3 provides an overview of the elements of the SBAR that were discussed for individual patients. The SBAR-items Situation (86.9%), Background (77.0%), Safety Concerns (Assessment) (77.6%) and required Actions (Recommendations) (87.0%) were mentioned for the majority of the patients in all wards. However, the timing/urgency of actions was mentioned only in 33.7% of the patients. In addition, the actions were rarely confirmed (5.7%). The structure of SBAR was hardly ever followed by the nurse in the specific given order (3.0%).

Table 3: Percentage of SBAR-elements discussed for individual patients during the rounds

Elements of observation protocol	Total no. and valid % of patients 'yes' (n=729)	Ward no. 1 (n=148)	Ward no. 2 (n=339)	Ward no. 3 (n=242)
1 Situation	629 (86.9)	134 (91.2)	307 (91.4)	188 (78.0)
2 Background*	423 (77.0)	58 (69.9)	214 (79.3)	151 (77.0)
3 Safety concerns	535 (77.6)	122 (84.7)	239 (77.9)	174 (73.1)
4 Actions	613 (87.0)	129 (94.2)	288 (88.1)	196 (81.3)
5 Timing/urgency of actions	233 (33.7)	78 (59.1)	80 (25.1)	75 (31.3)
6 Confirmation of actions	39 (5.7)	10 (8.1)	24 (7.4)	5 (2.2)
7 Structured according to SBAR	21 (3.0)	7 (5.2)	13 (4.0)	1 (0.4)

**The background element was changed during the study. In the first version it was defined very narrow but was broadened later on. This resulted in missing values on this element (not observed in final form for 180 patients).*

In figure 1, the use of the SBAR elements for all wards combined is distributed over the study period. It shows substantial variation in the items that were mentioned over time, but no long-term changes can be identified. There is a sharp drop in the percentage of patients for who the Situation and Timing is mentioned between the 10th and 11th observation and also a decline in the discussion of the other items. However, this percentage rises to the previous level with the 12th observation moment.

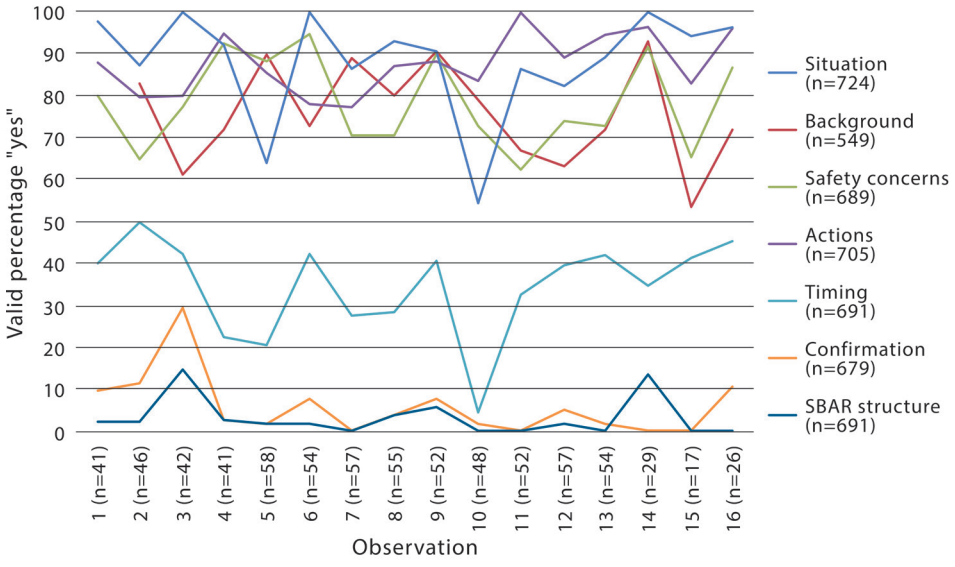

Figure 1: Mentioned SBAR-elements over time and use of SBAR-structure

Additional findings from notes

The notes made during the observations resulted in some additional relevant findings to place the results into context. The first finding relates to the implementation of SBAR. Even though the involved nurses were positive about the instrument beforehand and were committed to using it, the observations showed that it was not used as intended during the daily ward rounds. Even without explicit use of the SBAR-tool, many relevant items were still discussed for individual patients.

As described before, there were some differences between the wards in how the rounds were conducted. For example, if actions regarding treatment were executed immediately or at a later time. However, within the wards the daily rounds showed quite a stable pattern over time, no substantial changes occurred during the research period. In all wards, there was a prominent and leading role for the physician, and the nurses usually answered questions and provided information from the patient records when asked. Especially with more junior nurses it sometimes became clear that they did not prepare well enough for the daily rounds. Some could not answer relatively simple questions about the status of the patient, recent vital signs and actions that were taken. Even though the majority of the SBAR-elements was usually discussed for each patient, it sometimes remained unclear for the nurses what was exactly expected from them based on the discussion.

Individual differences between participants were also observed, some nurses were more assertive than others and they usually had a more prominent role during the rounds. Some nurses actively questioned decisions and suggestions made by the physician or gave suggestions for treatment or actions that should be taken. Also, some physicians explicitly tried to include the nurses more in the daily rounds by asking open ended questions about the status of the patient, suggestions for necessary actions and the opinion of the nurse. These physicians usually also took time to explain why certain decisions were made.

During some rounds the input from the nurses was not always valued by the physician. The observers also noticed that daily rounds were sometimes quite stressful, especially for junior nurses, because they were insecure about their ability to answer questions from the physician or to provide the necessary information. Hierarchical differences seemed to play a role in this; even though all members were usually friendly to each other during the rounds, there was a distinct hierarchy. Not only between physicians and nurses, but also amongst nurses (junior versus senior) and amongst physicians.

In one ward a similar instrument to SBAR was introduced halfway through the study. The aim was to increase the role of the nurses in the communication during the daily rounds. They were expected to take a leading role in communicating relevant information to the physician in a structured manner. The nurses were trained to apply this instrument during the daily rounds and a staff member from the hospital quality department joined the rounds to facilitate training and check the implementation. Although the researchers did observe some changes in the nurses behaviour during these weeks, the effect disappeared soon after the implementation period.

DISCUSSION

Main findings

This study showed that the elements Situation, Background, Safety Concerns and Actions were discussed for two-thirds of the individual patients by the care professionals. However, the element Timing of required actions was discussed for only one-third of the patients on average in the three wards. Without an explicit agreement on the timing of actions, it can remain unclear what the priority of an action should be, this may have consequences for the continuity of the treatment. The element of confirmation of required actions was left out in the information transfer for most of the patients. Confirmation is important to make sure that both participants share a common awareness of the situation and to be sure that the information received was understood correctly. The structure of SBAR was rarely used in the given order, also the communication was rarely initiated by the nurse to report the necessary information to the physician. The interaction between participants, such as giving suggestions and opinions, was limited during the daily ward rounds, but differed between the wards.

The results show that the physicians stayed in the lead, which could increase the threshold for nurses to actively use the tool and provide the information in a structured format, as they were mainly answering the questions of the physician. It is difficult to change this process in which it is common practice for the nurse to answer questions, instead of reporting the status of a patient in a structured manner. Opinions and suggestions for treatment were rarely given by nurses. The nurses usually followed the suggestions given by the physician and were not accustomed to question them; in almost half of the rounds it was not common to ask questions. The limited task of the nurse during rounds is not unique for our study. Manias & Street found that the task of the nurses during critical care ward rounds was mostly restricted to providing supplementary information [22]. That study also showed that nurses experienced barriers to participate in decision-making activities, such as feelings that their contributions were not valued [22]. The limited role for nurses was also mentioned by Busby

& Gilchrist, who recommended that nurses should participate more actively in the discussion and decision making and generally become more assertive. These observations from over twenty years ago still seem relevant: medical staff dominated the rounds and there is little involvement of other health care professionals [6]. The function of the nurse during the rounds was primarily to provide selected information for medical staff instead of taking a proactive role in the rounds.

One explanation that may prevent the use of SBAR during the rounds is the influence of usual practice during the rounds. It was not common practice in all our three observed wards for the care professionals to use a structured list of topics for the discussion of the patient status, this has also been described by others [23]. It could be argued that there may be no need for such a structure and that the common way of doing the daily ward rounds suffices. The results of our study show that many elements of SBAR were discussed without using a structured format. On the other hand, relevant items such as a timing of a certain action or reporting back were often not included in the discussion. These items should be addressed to complete the handover of information. In addition, using a certain structure, such as SBAR, could increase the mutual understanding between different professions because they know what they can expect from each other. Although the leading role of the physician has practical use; i.e. relevant information is collected efficiently to decide on further treatment, one can argue that a stronger role for the nurse can have benefits. They care for the patient all day and can provide additional relevant information that is not automatically obtained by asking direct questions. Therefore, within this setting of the daily rounds, it could be beneficial if nurses would speak up more often and play a more active role in the daily rounds.

When taking all this into account, it can be questioned whether it is feasible to start the change of this process by introducing a structured handover tool, such as SBAR, amongst the nurses with the goal to increase their role during the daily ward rounds. Several barriers, such as lack of structure, hierarchy, differences in communication style and language have previously been reported in nurse-physician communication [24-27]. Some of these barriers were also present in our study. In addition, a strong sense of usual practice makes it difficult to achieve change. Perhaps these barriers should be addressed first with other methods.

Study strengths and limitations

This study has several strong elements. First, the use of SBAR during the rounds on surgical departments is, to our knowledge, not studied this extensively before in a real time setting. The communication and information transfer between nurse and physician was observed for a large number of patients in three different wards. In addition, we also observed the general characteristics of the rounds for additional information on the procedure during the rounds. The longitudinal nature of the study provided the possibilities to follow the wards for a substantial period of time to get detailed information.

There are also some limitations. First, it was not possible in the current study to involve the physicians more extensively in the SBAR-implementation. Also, more positive enforcement from the nursing heads could have had a positive influence. More and prolonged attention may be required for a successful implementation. This could, for example, be achieved by more extensive training of nurses and physicians, more emphasis on the use of the instrument and periodic evaluation of the use of SBAR with the nurses and physicians. Second, SBAR was not primarily designed for use during hospital rounds. However, in the opinion of the nursing and medical heads, our adjustments made it a usable instrument for this setting. The third limitation refers to the study methods: the presence of the observers may have influenced the behaviour of the nurses and physicians (Hawthorne effect [28]), although the observers did not get the impression that this was the case. Also, the real-time observations may have resulted in missing some elements that were discussed. A final limitation of the current study is that the observers could only register whether the SBAR-elements were discussed, not if the content of the clinical situation was discussed completely or correctly. It is recommended that future studies take this into account by using record review in addition to real-time observations or by adding a observer with in-depth medical knowledge to the observation team.

CONCLUSION

To conclude, we found that many elements were discussed for the majority of individual patients but timing and confirmation of required actions were often not included during the daily ward rounds. Also, there was usually a leading role for the physician and little room for suggestions and opinions of the nurses. Even though the daily ward rounds were already quite thorough in the transfer of information between care professionals, there is still room for improvement. The use of a structured communication tool such as SBAR could potentially help to reduce hierarchical differences and to increase the role of the nurses during the rounds with the aim to come to a shared mental model about the status of a patient and to do this more efficiently. In order to

break through usual practice of the rounds, a more elaborate implementation process is required with active involvement of the nurses and physicians from the ward.

REFERENCES

1. Vermeir P, Vandijck D, Degroote S, et. al. Communication in healthcare: a narrative review of the literature and practical recommendations. Int J Clin Pract. 2015;69(11):1257-1267.
2. Sutcliffe KM, Lewton E, Rosenthal MM. Communication Failures: An insidious contributor to medical mishaps. Acad Med 2004;79:186-94.
3. Nagpal K, Vats A, Lamb B, et.al. Information transfer and communication in surgery: a systematic review. Ann Surg. 2010;252(2):225-239.
4. Pezzolesi C, Schifano F, Pickles J, et al. Clinical handover incident reporting in one UK general hospital. Int J Qual Health Care 2010;22:396-401.
5. Leonard M, Graham S, Bonacum D. The human factor: the critical importance of effective teamwork and communication in providing safe care. Qual Saf Health Care 2004;Suppl 1:i85-90.
6. Busby A, Gilchrist B. The role of the nurse in the medical ward round. J Adv Nurs 1992;17:339-346.
7. Stickrath C, Noble M, Prochazka A, et.al. Attending rounds in the current era: what is and is not happening. JAMA Intern Med 2013;173:1084-9.
8. Riesenberg LA, Leitzsch J, Little BW. Systematic review of handoff mnemonics literature. Am J Med Quality 2009;24:196-204.
9. Department of Defense, patient safety program. Healthcare communications toolkit to improve transitions in care. Healthcare Team Coordination Program. USA: Falls Church: 2005. Accessible through: http://www.oumedicine.com/docs/ad-obgyn-workfiles/handofftoolkit.pdf?sfvrsn=2. Last Accessed July 10, 2015.
10. Institute for Healthcare Improvement. Kaiser Permanente of Colorado, SBAR Toolkit. Available at: http://www.ihi.org/knowledge/Pages/Tools/SBARToolkit.aspx. Accessed July 16, 2015.
11. Haig KM, Sutton S, Whittington J. SBAR: a shared mental model for improving communication between clinicians. Jt Comm J Qual Patient Saf 2006;32:167-175.
12. Field TS, Tjia J, Mazor KM, et al. Randomized trial of a warfarin communication protocol for nursing homes: an SBAR-based approach. Am J Med 2011;124:179.e.1-7.
13. De Meester K, Verspuy M, Monsieurs KG, et al. SBAR improves nurse-physician communication and reduces unexpected death: a pre and post intervention study. Resuscitation 2013;84:1192-6.
14. Velji K, Baker GR, Fancott C, et.al. Effectiveness of an adapted SBAR communication tool for a rehabilitation setting. Healthc Q 2008;11:72-79.
15. Castle NG, Sonon KE. A culture of patient safety in nursing homes. Qual Saf Health Care 2006;15:405-8.
16. Renz SM, Boltz MP, Wagner LM, et al. Examining the feasibility and utility of an SBAR protocol in long-term care. Geriatr Nurs 2013;34:295-301.
17. Cunningham NJ, Weiland TJ, Van Dijk J, et al. Telephone referrals by junior doctors: a randomised controlled trial assessing the impact of SBAR in a simulated setting. Postgrad Med J 2012;88:619-626.

18. Randmaa M, Swenne CL, Martensson G, Hogberg H, Engstrom M. Implementing situation-background-assessment-recommendation in an anaesthetic clinic and subsequent information retention among receivers: A prospective interventional study of postoperative handovers. Eur j Anaesthesiol. 2016;33(3):172-8.

19. Zegers M, De Bruijne MC, De Keizer B, Merten H, Groenewegen PP, Van der Wal G, Wagner C. The incidence, root-causes, and outcomes of adverse events in surgical units: implication for potential prevention strategies. Patient Saf Surg 2011;5:13.

20. Merten H, Lubberding S, van Wagtendonk I, et al. Patient safety in elderly hip fracture patients: design of a randomised controlled trial. BMC Health Serv Res 2011;11:59.

21. VMS-zorg. SBAR. Available at: http://www.vmszorg.nl/_page/vms_inline?nodeid=4624&subjectid=6728. Accessed: 21 January 2014

22. Manias E, Street A. Nurse-doctor interactions during critical care ward rounds. J Clin Nurs 2001; 10:442-450.

23. Ilan R, LeBaron CD, Christianson MK, et al. Handover patterns: an observational study of critical care physicians. BMC Health Serv Res 2012;12:11.

24. Machaczek K, Whietfield M, Kilner K, et al. Doctors' and nurses' perceptions of barriers to conducting handover in hospitals in the Czech Republic. American Journal of Nursing Research 2013;1:1-9.

25. Thomas EJ, Sexton JB, Heimreich RL. Discrepant attitudes about teamwork among critical care nurses and physicians. Crit Care Med 2003;31:956-9.

26. Greenfield L. Doctors and nurses: A troubled partnership. Ann Surg 1999;230:279-88.

27. Robinson P, Gorman G, Slimmer LW, et al. Perceptions of effective and ineffective nurse-physician communication in hospitals. Nurs Forum 2010;45:206-16.

28. McCarney R, Warner J, Lliffe S, van Haselen R, Griffin M, Fisher P. The Hawthorne effect: a randomised, controlled trial. BMC Med Res Methodol 2007;7:30.